IN THE CLAIMS:

1. (Currently Amended) A method of classifying a defect on the surface of an article, which method comprises:

imaging the surface to form a defect image;

classifying the defect as being in one of a predetermined number of core classes of defects using a rule-based core classifier; and

classifying the defect as being in one of an arbitrary number of variant subclasses using a specific adaptive classifier associated with the one core class and associated with less than the predetermined number of core classes, the specific adaptive classifier being a classic [non rule-based] classifier trained by the user with a set of sample defect images.

2. (Original) The method according to claim 1, comprising classifying the defect as being in one of an arbitrary number of variant classes using a full classifier when the core classifier cannot classify the defect into one of the core classes.

3. (Original) The method according to claim 1, wherein the core classes of defects comprise a pattern defect and a particle defect.

4. (Original) The method according to claim 3, wherein the core classes of defects comprise a missing pattern on the surface, an extra pattern on the surface, a particle on the surface, a particle embedded in the surface, and microscratches on the surface.

5. (Original) The method according to claim 4, wherein the variant subclasses of defects comprise a particle of a predetermined size on the surface or embedded in the surface.

6. (Original) The method according to claim 1, comprising providing a plurality of specific adaptive classifiers, each being associated with less than the predetermined number of core classes.

7. (Original) The method according to claim 1, comprising performing a boundary analysis of the defect image, a topographical analysis of the defect image, or both to classify the defect into the one core class.

8. (Original) The method according to claim 7, comprising:

training the specific adaptive classifier to identify defects of the variant subclass based on an exemplary set of known predicates of defects of the variant subclass; and

analyzing predicates associated with the defect image, using the specific adaptive classifier, to classify the defect into one of the variant subclasses.

9. (Original) The method according to claim 8, comprising training the specific adaptive classifier using decision tree or multidimensional clustering techniques.

10. (Currently Amended) An apparatus for classifying a defect on the surface of an article, comprising:

an imager to produce an image of the defect; and

a processor comprising:

a rule-based core classifier for classifying the defect as being in one of a predetermined number of core classes of defects, and

a specific adaptive classifier associated with the one core class and associated with less than the predetermined number of core classes for classifying the defect as being in one of an arbitrary

number of variant subclasses, the specific adaptive classifier being a classic [non rule-based] classifier trained by the user with a set of sample defect images.

11. (Original) The apparatus according to claim 10, wherein the processor further comprises a full classifier for classifying the defect as being in one of an arbitrary number of variant classes when the core classifier cannot classify the defect into one of the core classes.

12. (Original) The apparatus according to claim 10, wherein the core classes of defects comprise a pattern defect or a particle defect.

13. (Original) The apparatus according to claim 12, wherein the core classes of defects comprise a missing pattern on the surface, an extra pattern on the surface, a particle on the surface, a particle embedded in the surface, and microscratches on the surface.

14. (Original) The apparatus according to claim 13, wherein the variant subclasses of defects comprise a particle of a predetermined size on the surface or embedded in the surface.

15. (Original) The apparatus according to claim 10, comprising a plurality of specific adaptive classifiers, each being associated with less than the predetermined number of core classes.

16. (Original) The apparatus according to claim 10, wherein the processor is further configured to perform a boundary analysis of the defect image, a topographical analysis of the defect image, or both to classify the defect into the one core class.

17. (Original) The apparatus according to claim 16,

wherein the specific adaptive classifier is trainable to identify defects of the variant subclass based on an exemplary set of known predicates of defects of the variant subclass; and

wherein the specific adaptive classifier is for analyzing predicates associated with the defect image to classify the defect into one of the variant subclasses.

18. (Original) The method according to claim 17, wherein the specific adaptive classifier is trainable using decision tree or multidimensional clustering techniques.

19. (Curently Amended) A classic-style [non rule-based] specific adaptive classifier, trained by the user with a set of sample defect images, for classifying a defect on the surface of an article as being in one of an arbitrary number of variant subclasses of a core defect class of a predetermined number of core classes, the specific adaptive classifier being associated with less than the predetermined number of core classes and responsive to a rule-based core classifier for classifying the defect as being in the core class.

20. (Original) The specific adaptive classifier of claim 19, wherein the specific adaptive classifier is trainable to identify defects of the variant subclass based on an exemplary set of known predicates of defects of the variant subclass; and

wherein the specific adaptive classifier is for analyzing predicates associated with an image of the defect to classify the defect into one of the variant subclasses.

21. (Original) The specific adaptive classifier of claim 20, wherein the specific adaptive classifier is trainable using decision tree or multidimensional clustering techniques.

22. (Previously Presented) A computer-readable medium bearing instructions for automatically classifying a defect on the surface of an article, said instructions, when executed, being arranged to cause one or more processors to perform the steps of:

imaging the surface to form a defect image;

classifying the defect as being in one of a predetermined number of core classes of defects based on a set of rules; and

classifying the defect as being in one of an arbitrary number of variant subclasses based on the classification of the defect as being in the one core class and being in less than the predetermined number of core classes, and based on training by the user with a set of sample defect images.

23. (Original) The computer-readable medium according to claim 22, wherein the instructions, when executed, are arranged to cause the one or more processors to perform the step of classifying the defect as being in one of an arbitrary number of variant classes when the one or more processors cannot classify the defect into one of the core classes.

24. (Original) The computer-readable medium according to claim 22, wherein the core classes of defects comprise a pattern defect and a particle defect.

25. (Original) The computer-readable medium according to claim 24, wherein the core classes of defects comprise a missing pattern on the surface, an extra pattern on the surface, a particle on the surface, a particle embedded in the surface, and microscratches on the surface.

26. (Original) The computer-readable medium according to claim 25, wherein the variant subclasses of defects comprise a particle of a predetermined size on the surface or embedded in the surface.

27. (Original) The computer-readable medium according to claim 22, wherein the instructions, when executed, are arranged to cause the one or more processors to perform a boundary analysis of the defect image, a topographical analysis of the defect image, or both to classify the defect into the one core class.

28. (Original) The computer-readable medium according to claim 26, wherein the instructions, when executed, are arranged to cause the one or more processors to perform the steps of:

learning to identify defects of the variant subclass based on an exemplary set of known predicates of defects of the variant subclass; and

analyzing predicates associated with the defect image to classify the defect into one of the variant subclasses.

29. (Original) The computer-readable medium according to claim 28, wherein the instructions, when executed, are arranged to cause the one or more processors to perform the learning step using decision tree or multidimensional clustering techniques.

30. (Original) The computer-readable medium according to claim 22, wherein the instructions, when executed, are arranged to cause the one or more processors to perform the step of imaging the surface with a scanning electron microscope.